

Status of the US LQCD Infrastructure Project

Bob Sugar

Overview

- SciDAC-2 Proposal
- The LQCD Computing Project

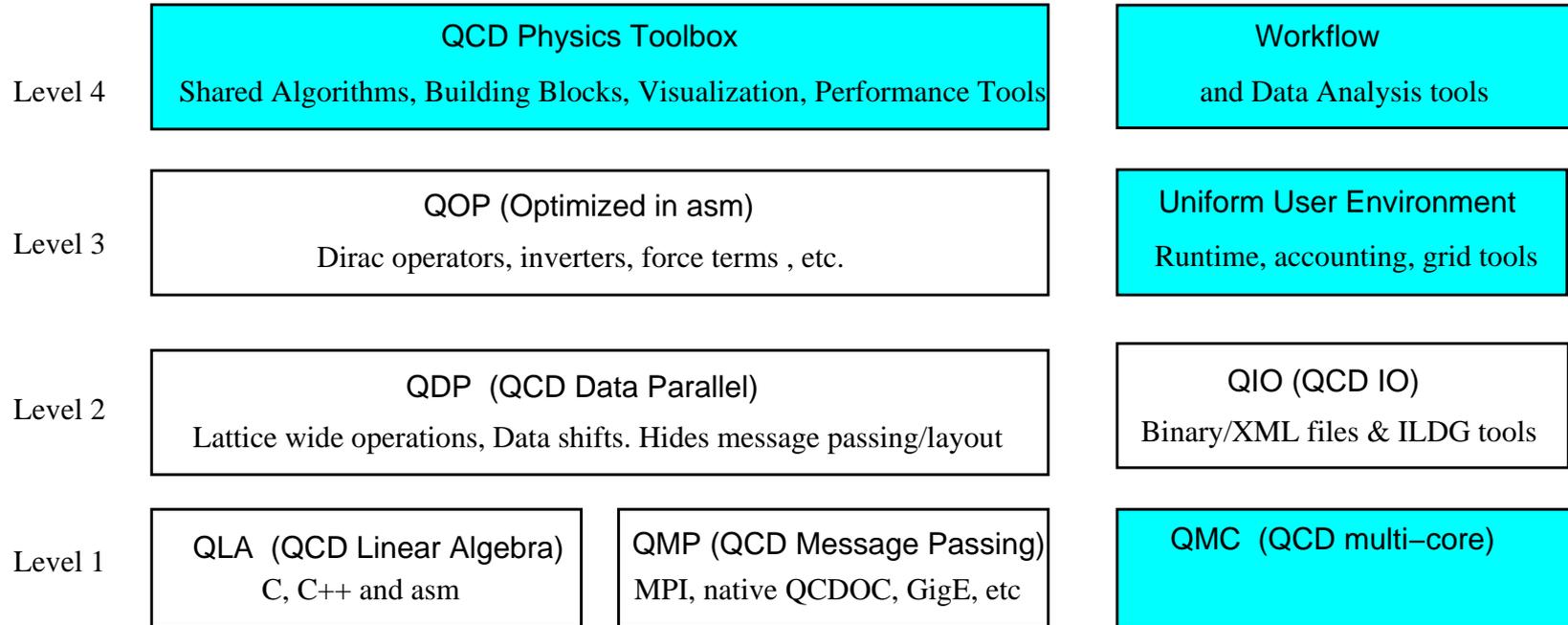
SciDAC-2 Proposal

- Two areas of emphasis
 - Software
 - Hardware Research and Development
- Fourteen participating institutions
 - Three national laboratories
 - Eleven universities

Major Components of SciDAC-2 Software

- Machine specific software
- Infrastructure for physics applications
- Uniform computing environment

SciDAC Software



Increased Participation of Computer Scientists

- Ted Bapty (Vanderbilt):
Monitoring and controlling large computers
- Massimo DiPierro (DePaul):
Visualization
- Dan Reed and Ying Zheng (North Carolina):
Performance analysis
- Xien-He Sun (IIT):
Workflow for large physics analysis projects

Hardware Research and Development

- Investigation of Cluster Components
- Investigation of a specialized computer for lattice QCD

DOE Strategic Timelines

- High Energy Physics Program (2009):
“Use computer simulations to calculate strong interactions between particles so precisely that theoretical uncertainties no longer limit our understanding of their interactions.”
- Nuclear Physics Program (2017):
“Provide precise lattice calculations to compare with established nucleon properties.”

Lattice QCD Computing Project

● Objectives

- Acquire the most capable and cost-effective hardware for lattice QCD on a yearly basis
- Operate the SciDAC Prototype clusters, QCDOC and hardware acquired in the Project

● Budget

	FY 2006	FY 2007	FY 2008	FY 2009
Hardware	1,850	1,694	1,630	798
Operations	650	806	870	902
Total	2,500	2,500	2,500	1,700

Budget figures are in thousands of dollars.

Plan for FY 2006

- Baseline: October, 2005
 - SciDAC Prototype Clusters – 1.7 Tflop/s
 - QCDOC – 4.2 Tflop/s
- FY 2006 JLab Cluster
 - 128 + 128 dual core Pentium 830-D Nodes
 - Infiniband interconnect
 - 0.6 Tflop/s
 - \$0.86 per Mflop/s
- FY 2006 FNAL Cluster
 - 450 dual-core, dual-processor nodes
 - Infiniband interconnect
 - $1.7 + 0.3 = 2.0$ Tflop/s

Plan for FY 2007

- Baseline: October 2006
 - Clusters – 4.3 Tflop/s
 - QCDOC – 4.2 Tflop/s
- Large cluster at JLab
 - Multi-core, multi-processor nodes
 - Infiniband interconnect
 - Milestone is 3.1 Tflop/s

Project Management

- Federal Project Manager: John Kogut
- Contract Project Manager: Don Holmgren
- Associate Contract Project Manger: Bakul Banerjee
- Site Mangers
 - BNL: Tom Schlagel
 - FNAL: Amitoj Singh
 - JLab: Chip Watson

Project with a Capitol P

- Well defined work responsibilities and budgets
- Regular reporting on progress in all aspects of the work
- Milestones which must be met
 - Hardware acquisition
 - Hardware operation
 - Science
- Yearly submission of Exhibit 300 to the Office of Management and Budget
- Yearly project review

Our Responsibilities

- Perform calculations that will have major impacts on research in high energy and nuclear physics
- Raise the visibility of our field in the broader physics community
- Provide data on our scientific progress in a timely fashion
 - Enable Don Holmgren to report progress in meeting science milestones
 - Enable John Kogut to keep interested parties within the DOE up to date on our progress
- Provide input on user needs to the project management

HAPPY RETIREMENT

JEFF